

The Applicant's invention is directed to a method of forming a bump, including performing wet etching a bonding pad on the wafer, and then sequentially forming an under ball metallurgy layer and a bump. Hillocks on the bonding pad can be removed after the wet etching process, and the bump has a planar or concave surface, whereby no nodules are formed on the bump.

#### **Discussion of Office Action Rejections**

The Office Action rejected claims 1-11 under 35 U.S.C. 102, as being anticipated by Lin et al.. Applicants respectfully traverse the rejections set forth below.

The present invention is directed to a method of forming a bump, *including performing wet etching a bonding pad on the wafer*, and then sequentially forming an under ball metallurgy layer and a bump. Hillocks on the bonding pad can be removed after the wet etching process, and the bump has a planar or concave surface, whereby no nodules are formed on the bump.

Due to the wet etching on the bonding pad, at least the hillock can be removed or even a concave structure 404 can be formed. This is helpful for the subsequent process to form the bump structure, including the formation of UBM layer and bump.

In re Lin et al., even though a wet etching process is included (col. 7, line 66 – col. 8, line 20), however, *the wet etching process is to strip the photoresist layer 38 (see Fig. 6), but not to remove the hillock on the bonding pad.*

Further still, it should be noted that, the wet etching process is performed after the *UBM layer 36* (col. 8, lines 27- 36) has been formed on the bonding pad 32. It is not true that the Office Action considers the electroplated layer 39 as the UBM layer (actually is 36).

In fact, Lin et al. failed to disclose the wet etching on the bonding pad 32. The wet etching process on the bonding pad can at least remove the hillock 204 as shown in FIG. 2 of Applicant Admitted Prior Art, or even form a concave region 404. As a result, the present invention can improve the reliability of bump structure, which is subsequently formed.

In re Higdon et al. (U.S. Patent 6,281,106) and Akram et al. (U.S. Patent 6,365,967), both made of record and not relied upon are also failed to disclose the features missing in Lin et al.

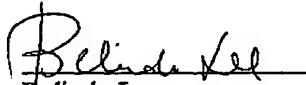
For at least the foregoing reasons, Applicant respectfully submits that independent claims 1, 6, and 12 patently define over the prior art references, and should be allowed. For at least the same reasons, dependent claims 2-5, 7-11, and 13 patently define over the prior art references as well.

**CONCLUSION**

For at least the foregoing reasons, it is believed that all pending claims 1-13 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,

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**VERSION WITH MARKINGS TO SHOW WHERE CHANGES MADE****In The Specification**

Please amend the paragraph beginning at Page 7, line 17 as follows:

Fig. 6 is a schematic, cross sectional view of a bump formed according to a preferred embodiment of the present invention. The wafer 400 has a plurality of bonding pads 402 and a protection layer 406. The protection layer 406 is used to protect the surface of the wafer 400 and exposes part of the bonding pad 402 for external connection. The bonding pad 402 can be made of metals, such as aluminum. The aluminum bonding pad 402 usually has some hillocks thereon. In one preferred embodiment of the present invention, the bonding pad 402 is subject to a pretreatment by wet etching. An etchant used in the wet etching can be a peroxide such as hydrogen peroxide, hydrogen, or acids such as 60% - 80% phosphoric acid ( $H_3PO_4$ ), more than 10% nitric acid ( $HNO_3$ ), more than 10% acetic acid, or the combination thereof. The surface of the bonding pad 402 becomes planar or concave 404 after wet etching. Then, a UBM layer 408 is formed on the exposed bonding pad. A bump 410 is formed on the UBM layer 408. The bump 410 can be made of metal such as gold. Further, the bump 410 formed on either the planar surface or concave surface of the bonding pad 402 has a smooth surface.

**In The claims**

Please add claims 12-13.

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